GOVERNMENT OF INDIA
WATER RESOURCES, RIVER DEVELOPMENT AND GANAGA REJUVENATION
LOK SABHA

UNSTARRED QUESTION NO:2132
ANSWERED ON:10.03.2016
Study on Brahmaputra
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Will the Minister of WATER RESOURCES, RIVER DEVELOPMENT AND GANAGA REJUVENATION be pleased to state:

(a) whether any study on Brahamaputra River erosion and its control has been conducted by Indian Institute of Technology, Roorkee;
(b) if so, the details thereof along with recommendations made therein including follow up action taken by the Government thereon; and
(c) the funds allocated/released for erosion control in Assam during the last five years?

Answer

THE MINISTER OF STATE FOR WATER RESOURCES, RIVER DEVELOMPMENT & GANGA REJUVENATION
(Prof. SANWAR LAL JAT)
(a) Yes, Madam. National Disaster Management Authority (NDMA), Government of India requested the IIT Roorkee in April, 2008 to conduct a Study of Brahmaputra River Erosion and its Control.
After incorporating the comments on the draft report given by CWC, Brahmaputra Board and Water Resources Department of Government of Assam, the Final Report on the above study was submitted by IIT Roorkee to NDMA in May, 2012.
(b) The recommendations made in the Study carried out by IIT Roorkee include;

? Sediment ingress in Brahmaputra River has to be controlled vigorously in addition to developing cost-effective erosion control measures such as multiple tier RCC Jack Jetty Field system,
? Closures of subsidiary channels has to be undertaken,
? The mathematical models developed for the river system need to be improved periodically in addition to developing new flood forecasting & channel improvement models,
? Undertaking field pilot studies,
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? Strengthening and upgrading of existing data acquisition and processing infrastructure by procuring new equipment/ data,
? Creation of comprehensive data base, and
? The need for establishment of an autonomous well-equipped R&D Centre.
The detailed recommendations of the study are given at Annexure-I.

Flood Management is the prime responsibility of State Government, Water being a State subject. Government of India provides promotional support to the State Governments in this regard. Accordingly, the Government of India had launched Flood Management Programme (FMP) in XI Plan for providing promotional support to the State Governments for undertaking works related to flood control, river management, anti-erosion, restoration of damaged flood management works and anti-erosion. The continuation of FMP during XII Plan had been approved by Cabinet in October, 2013 with an outlay of Rs. 10,000 crore and scope of FMP was extended to cover catchment area treatment works.
(c) During last five years (2010-11 to 2015-16) till date the central assistance of Rs. 461.84 crore has been released to Government of Assam under Flood Management Programme (FMP) for flood management and anti-erosion works.
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Annexure-I

Annexure referred to in reply to part (b) of Unstarred Question No. 2132 due for reply in Lok Sabha on 10.03.2016 regarding Study on Brahmaputra

Detailed recommendations of the study carried out by IIT, Roorkee:-

1. Data analysis and computer simulation studies conducted in the present study have succinctly brought out that the prime causative factor of stream bank erosion vis-a-vis channel instability processes of the Brahmaputra can be attributed to inherent "sediment overloading" of the river fluvial system accompanied by intensification of channel braiding configuration. In the light of aforesaid observation, it is recommended to rigorously control sediment ingress into the Brahmaputra river system through comprehensive watershed management as well as development programme; and also undertake sustainable channelization measures by effecting closure of subsidiary channels through adoption of appropriate river training techniques.

2. In view of the fact that extensive extent of stream bank-line is under grip of unabated erosion process, it is recommended to deploy cost-effective erosion control measures, namely multiple tier RCC Jack Jetty Field system along with submerged vanes as per site condition feasibility. The required layout of Jack Jetty field may be appropriately devised by carefully considering the suitable Jack Jetty Density Index (JJDI) and Jack Jetty Submergence Index (JJSI) at the time of implementation of field pilot schemes after duly

accounting for the prevailing river configuration. The Jack Jetty Field can be desirably designed to reclaim eroded land from the river.

3. The braiding phenomenon of the Brahmaputra has displayed a sharply increasing trend in the recent decades giving rise to highly disturbing incidence of channel instability in the wake of stream bank erosion process. As stated earlier, it is recommended to urgently undertake measures to control the rise of braiding intensity through effective closure of subsidiary channels with the help of Jack Jetty Screen and submerged vanes protected by Reno Mattress.

4. To start with, field pilot studies may be undertaken at two sites - one near Soalkuchi-Gauwahati and other near Morigaon(Bhuragaon) for which preliminary designs have been evolved. The preliminary design- may be desirably fine-tuned at the time of implementation as mentioned at para 2 above, as well as after critically reviewing their performance in the post flood season.

5. The R&D endeavour of the present study to evolve ANN models for simulating hydrologic response for runoff and sediment of Subansiri tributary watershed which is the largest tributary of the Brahmaputra system is found to be quite encouraging. It is recommended to use and periodically improve these models with availability of more field data in future and also replicate similar modeling for other major tributaries.

6. The mathematical model developed herein as a preliminary work with the help of HEC-RAS 4.1 may be used on trial basis to start with for flood forecasting and preliminary channel improvement purposes. However, a fully dedicated comprehensive study is recommended to develop a fully mobile river-bed and stream-bank erosion model which is capable of simulating complex fluvial phenomena of the Brahmaputra such as secondary flow / flow vortices, turbulence & mass dispersion of sediment-laden flow using concept of Reynolds"s stresses, hydraulic transients of water and sediment, and morphodynamic fluxes as per state-of-the-art.
7. On account of the prevalent inadequacy of reliable and consistent field data, modeling in relation to erosion, sediment inflow and flood forecasting may have certain elements of inconsistencies and discrepancies, resulting in fallacious prediction of future scenario. It urgently warrants strengthening and upgrading of existing data acquisition and processing infrastructure at the ground level of the concerned agencies. Following equipment/data should urgently be procured for the existing or proposed data acquisition establishments of the field agencies / organizations.

(i) Data acquisition instruments −
a. Acoustic Doppler current profilers (ADCPs)
b. Ultrasonic Flow Meter / Fluorometer
c. Latest Sediment Sampler
d. Portable Suspended Sediment Analyzer
e. Laser Particle Size Analyzer
f. Total Station and GPS
g. Automatic Gauge Level Recorder
h. Laser Doppler Velocimeter (LDV) with phase Doppler particle Analyzer
(PDPA) for R&D purposes

(ii) Upgrading of Surveyed Hydrographic Data
a. survey of cross sectional data interval should be of the order of 500m at least between two given sections for good quality mathematical model development and analysis.
b. The cross-sections survey should be updated regularly (at say every five years interval) depending on observed hydrological events.
c. Flow measurements for high flood events using automated system.

(iii) Optical and Microwave Satellite Data Procurement
a. For monitoring and change detection of spatial and temporal features in the river and in the basin including flood plain.

(iv) Improving the spatial density of hydro-meteorological data acquisition network
a. Hydrological data (stage, Discharge & Sediment) observation stations may be increased by including / restoring sites near Tezpur (Koliabhomora Bridge), Bessamara (Majuli), Bogibeel (New Bridge near Dibrugarh), in addition to the existing sites at Pandu & Jogighopa.
b. The spatial density of Meteorological stations requires to be significantly upgraded along with installation of the latest data acquisition and data logging systems.

(v) Development of Management Information System (MIS) for main stem Brahmaputra along with the flood plain / catchments, tributaries.

8. Capacity building of the technical manpower associated at various levels of river management is recommended through periodic professional training on latest advances in the technology

9. Creation of a comprehensive data base comprising all pertinent data & information using latest data management system.

10. Establishment of an autonomous well-equipped R&D centre to be manned by highly competent manpower for conducting applied research at state-of-the-art level.
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